BMJ Open

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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-020603
Article Type:	Research
Date Submitted by the Author:	13-Nov-2017
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Keywords:	district health system, district health manager, management training, training program evaluation, Iran

Title page:

Evaluation of district health management fellowship training program: A case study in Iran

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Key works: district health system, district health manager, management training, training program evaluation, Iran

Word count: 2605

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Abstract:

Objective: To evaluate district health management fellowship training program in north-west of Iran.

Data sources/study setting: The program was introduced to build the managerial capacity of district health managers in Iran. 89 heads of units in the province's health center, district health managers and health deputy of district health center in North-West provinces of Iran had registered to district health management fellowship training program in Tabriz in 2015-2016.

Study design: This study was an evaluation of training courses to measure participants' reactions, learning, application of training to their job, and to a lesser extent, organizational impact.

Data collection/extraction methods: Valid and reliable questionnaires were used to assess learning techniques, views toward the fellowship and self-assessment of health managers' knowledge and skills. Also, the pretest and posttest examinations in each course were conducted and a portfolio was provided for trainees to complete in their work settings.

Principal findings: About 63% of the participants were medical doctor and 42.3% of them had over 20 years of experience. Learning by practice (scored 18.37 out of 20) and access to publications (17.27) were the most useful methods to training health planning and management from the participants' perspective. Moreover, meeting peers from other districts and academic credibility of teachers were the most important features of current program. Based on managers' self-assessment, they were most skillful in quality improvement, managing, and planning and evaluation of the district. The result of posttest analysis on data collected from district health managers showed the highest scores in managing the district (77 out of 100) and planning and evaluation (69) courses.

Conclusion: The result of this study indicated acceptable and satisfactory rate of training courses, teaching method and improvement in managers' knowledge about health system and skills necessary to manage their organization.

Article summary:

*Strengths **and** limitations of this study:*

- Use of short term and more subjective measures, pre-test and post-test rather than real impact of the program.
- High rate of managerial turnover makes it impossible to follow up the impact of program
- We do not analyse the role of other factors and confounders
- The developed program was used as a applicable package for training district health managers by ministry of health across country.
- Training contents were considered as applicable, useful and relevant to real work settings

Introduction:

Health system is the arrangement with organizational structure, physical resources, and different staff to improve health status of specific population. In last decades, strengthening the health system and its infrastructure has become as one of the priorities in progressive health systems especially in developing countries [1].

Strengthening of leadership and management in health system is one of the most challenging issues to be measured and there is few empirical examinations of its impact on service delivery

and health outcomes [2 3]. In addition, existing literature in developing countries indicates shortfalls in managerial capabilities and training programs. For example, Muchekeza et al conducted a study in Zimbabwe and they concluded that almost half of the district health managers do not list the tasks of district health executives and some of them had insufficient managerial skills and training programs [4]. Also, financing, health policy, and health management were perceived as the most essential needs of management trainings in Kenya, Nigeria and Senegal [5]. Bonenberger et al. demonstrated that data management, attending workshops, travelling, financial management, training of staff and drug and supply management were the highest time consuming tasks of district health managers in Ghana [6]. Furthermore, Asante et al. recognized that lack of skills in financing and human resource management among provincial health departments in the Solomon Islands were the highest concern while management support systems were not able to support managers [7].

Filerman indicated that the core competencies of health management were human resources management, general management skills and skills of top management [8]. Team based job training is an effective strategy to improve the effectiveness of management training programs [8]. The interventions designed to strengthen leadership and management must emphasize on changes in health and service delivery outcomes. However, due to complications in invastigatinge the relationship between managers' empoverment program with health provision and health status, many researchers have concentrated on managers' knowledge and skills [3 9]. According to De Brouwere's and Van Balen H's study, after implementing 12-week training course in Zaire, most of trainees applied the learned skills and knowledge. Also, team-based district health management, using of update and participatory approaches in training program could be contributed to the success of training course[10].

In Iran, the district health managers of direct rural health facilities, district hospitals, health centers, and health posts. Each of these facilities involve in providing particular cares. District hospitals deliver inpatient and outpatient services. Health centers concentrate on ambulatory and preventive services. Health posts are supposed to be the first line of exposure for patients and they are providing a large range of preventive and primary services. Also, department of provincial health center directs district health centers. Like many developing countries, general physicians are appointed as health managers of districts and sub-districts centers without any formal or in-work training [11 12].

The focus of new proposed reform in the health system that is supported by the World Bank is on market mechanisms, effectiveness and efficiency [13]. Because of the managers capabilities and their influences especially in first-line, management is one of the key determinants of health system effectiveness [8]. For instance, Conn et al. found that strengthening health management program in Gambia led to some improvements in district-level health services especially in team planning and coordination, and management of the available but limited resources [14]. Besides, Pfeffermann determined strengthening health management programs as most cost- effective interventions [15].

This study aimed to evaluate district health management fellowship training program using Kirkpatrick's four levels model (Reaction, Learning, Application and Impact) [16], in north west of Iran. The program was designed to build the managerial capacity in Iranian district health managers.

Materials and Methods:

Design and setting

This study was an evaluation of training programs based on Kirkpatrick's framework to measure participants' reactions, learning, and application of training in their career, and to the less extent, organizational impact. It was conducted between June 2015 and February 2016 in Tabriz.

Participants and the training program

Following the educational needs assessment proposed by the Ministry of Health, Treatment and Medical Education, a training program was developed and introduced for district health system managers in order to improve managers' skills and knowledge about health system management in National Public Health Management Centre (NPMC) of Tabriz University of Medical Sciences [17]. As a result, 89 health managers registered for this training program. Two cohorts of 89 health officials (44 and 45 participants in each cohort) were selected by Ministry of Health, Treatment and Medical Education to participate in the courses (Table 1). Our target population was all heads of provincial health centers, district health managers, and health deputy of district health center in north-west provinces of Iran.

Table 1: Training Courses of District Management Training Fellowships

Educational Courses	Summary of Content	Location*	Date (duration)
Management, Leadership	Basic Concepts of management, Leadership and supervision, Change management, Team management Conflict management, Basic Skills in Communication, Staff motivation	NPMC Tabriz, Iran	June 2015 (2 days)
Managing the District	Introduction to health and health system, PHC approach in the organization and management of health services, District health systems, Disaster preparedness, Development plans	NPMC Tabriz, Iran	June 2015 (2 days)
Quality Improvement	Quality Management in Health Systems, Quality improvement approaches, Quality improvement methods, Focus PDCA, Clinical audit, Process mapping	MUMS, Maraghe, Iran	August 2015 (3 days)
Planning and Evaluation	Situation analysis of district health, Strategic planning, Operational planning, Evaluation Methods and accreditation, Priority setting, Project planning methods	AUMS, Ardabil, Iran	September 2015 (3 days)
Health information Management	Health management information systems, Health indicators, Health data analysis	ZUMS, Zanjan, Iran	October 2015 (2 days)

Health Resources Management and Economics	Accrual accounting, Financial control, Payment mechanisms, Health economy, Management of Physical Infrastructure, Health insurance, Cost Calculation and Budgeting	NPMC Tabriz, Iran	November 2015 (3 days)
Community participation	Health need assessment in district, Health education techniques, Community Participation methods, Multisectoral Collaboration and advocacy, Social marketing, Techniques and methods for public participation	NPMC Tabriz, Iran	November 2015 (2 days)
Epidemiology	Introduction to Epidemiology, Epidemiological assessment of health Situation in a district,	NPMC Tabriz, Iran	December 2015 (2 days)
Research in health system	Quantitative and Qualitative research in health system, Data management, Data analysis	NPMC Tabriz, Iran	January 2016 (3 days)
Human Resources and Organizational creativity	Human resources management, Employee training and empowering, Effective communication, Time management, Creativity and Innovation	NPMC Tabriz, Iran	February 2016 (1 day)
Rules and ethics	Management ethics, Legal issues in Management, External inspection and accounting	NPMC Tabriz, Iran	February 2016 (1 day)

*National Public Health Management Centre (NPMC), Maraghe University of Medical Sciences (MUMS), Ardabil University of Medical Sciences (AUMS), Zanjan University of Medical Sciences (ZUMS)

Data collection and instrument

A valid and reliable questionnaire was used to collect data from participants. We used the questionnaire was designed in University of Leeds and previously were adapted and tested by NPMC staff and was used as an applicable tools to elucidate management training courses in NPMC[18]. The questionnaire contains four sections: 1) questions about demographic characteristics of respondents, 2) previous training experiences, the importance of current training program and satisfaction from different learning methods in health planning and management among district heath managers, 3) health managers' perceptions about usefulness and applicability of training programs 4) self-assessment of health managers' knowledge, skills and relevance to their job description and future training topics. Totally, 72 of the 89 training participants (response rate= 81%) filled up and gave back the questionnaire in (Table 2).

The satisfaction about different learning methods was rated based on four-point Likert scale (very high, high, moderate, low) and the experiences of different learning methods were dichotomous variable. Also, the importance of each method was rated on a 0-20 scale.

Regarding to assessment of the usefulness and application of training presented materials, respondents were asked to indicate their agreement from 15 statements (Due to negative meaning of some items, sometimes very high had negative effect on score) on a five-point Likert scale. Finally, the results were presented on a three-point scale as: agree, neutral and disagree.

Self-assessment of health managers ' knowledge and skills was rated on a four-point scale, and relevance of courses to their work and future trainings were rated on a three-point scale and dichotomous yes or no, respectively.

Furthermore, the pretest and posttest examinations in each course were conducted to evaluate the usefulness of courses in terms of contents. Pretests were performed at the beginning of each course. Simultaneously the posttest relate to previous course was performed. Also, a portfolio which was based on fellowship content provided to trainees to complete in their work settings.

Ethical Considerations:

The Tabriz University of Medical Sciences Research & Ethics Committee approved the design and procedure of this study. In addition, to conduct this study, all participants provided their written, signed informed consent before enrolling in the study and filling up the questionnaire. Lastly, participants who were not interested in contribution or who did not continue the research process were excluded from the study.

Questionnaire Analysis:

Descriptive statistics (Mean, Standard Deviation (SD) and frequencies (%)) were used to point out the basic properties of variables for quantitative and categorical variables. Also, correcting

pretest and posttest examinations conducted based on standard scoring and the normalized as zero to 100. For statistical relationship analysis the SPSS-17 statistical package (SPSS, Chicago, IL) was used.

Result:

According to findings, 84.7 percent of participants were male, 61.5% of participants were between 40 to 50 years old, 41.7% of them were district health manager and 27.8% heads of units in provincial health centers. About 63.9 percent of the participants were medical doctor. Only 5.6% of participants worked 5 years or less in their current position and 36.1% of them had more than 20 -years work experience. (Table 2)

Table 2: demographics of participants in rating educational assessment

Variable	NO	%
Sex		
Male	61	84.7
Female	11	15.3
Age		
< 40	17	25
40 - 50	43	61.5
> 50	9	13.5
Education		
BSc	14	19.4
MSc	8	11.1
MD	46	63.9
PhD	4	5.6
Job Position		
Head of Unit	20	27.8
Head of District Health deputy	22	30.5
District health manager	30	41.7
Years in Current Job		
< 5	4	5.6
5 - 10	6	8.3
10 – 15	12	16.7
15 - 20	24	33.3
> 20	26	36.1

Learning for health planning and management

Respondents were asked to choose points out of range between 0- 20 points about 13 learning methods, assigning higher points to the more important methods. In this regard, learning by practice (scored 18.37 out of 20), access to publications (17.27), and workshops, meetings and conferences (14.99) were chosen as the three most important methods. (Table 3)

Also, trainees indicated that learning by practice (81.9%), working with experienced persons (73.6%), discussion with colleagues during workshops (72.2%), and meetings and conferences (70.8%) were the post experienced learning methods among health managers. (Table 3)

In satisfaction level, respondents determined learning by practice, working with experienced persons, discussion with colleagues, working with colleagues who shared training and workshops, meetings and conferences as the highest influential factors. Also, On-line learning and Practice or being involved in research reported as most unsatisfactory methods to training planning and management. (Table 3)

Table 3: Experiences and Importance of and satisfaction with learning techniques about health planning and management among district heath managers

Learning method	Importance of learning techniques*	Having experience in learning methods**	Satisfaction with learning techniques No (%)			
	Mean (SD)	No (%)	Very High	High	Moderate	Low
Learning by practice	18.37 (2.1)	59 (81.9)	29 (41.4)	33 (47.1)	8 (11.4)	
Working with experienced persons	13.12 (4.9)	53 (73.6)	26 (37.7)	37 (53.6)	5 (7.2)	1 (1.4)
Access to publications	17.27 (2.7)	49 (68.1)	8 (12.5)	33 (51.6)	20 (31.3)	3 (4.7)
Practice or being involved in research	14.75 (3.7)	33 (45.8)	7 (12.5)	18 (32.1)	26 (46.4)	5 (8.9)
On-line learning	13.07 (4.6)	28 (38.9)	5 (9.4)	17 (32.1)	23 (43.4)	8 (15.1)
Study tours	15.53 (3.4)	19 (26.4)	9 (22.0)	12 (29.3)	8 (19.5)	12 (29.3)
Formal certified training	12.90 (5.3)	47 (65.3)	9 (15.0)	29 (48.3)	16 (26.7)	6 (10.0)
Attending in workshops, meetings & conferences	14.99 (3.9)	51 (70.8)	16 (24.2)	32 (48.5)	17 (25.8)	1 (1.5)
Working with colleagues who shared training	10.72 (5.5)	46 (63.9)	17 (27.4)	34 (54.8)	9 (14.5)	2 (3.2)
Discussions with colleagues	12.72 (4.8)	52 (72.2)	19 (27.9)	35 (51.5)	13 (19.1)	1 (1.5)
Networks	12.68 (6.1)	39 (54.2)	8 (13.5)	23 (39.0)	23 (39.0)	5 (8.5)

Twinning of organizations	12.78 (4.7)	35 (48.6)	8 (13.8)	20 (34.5)	23 (39.7)	7 (12.1)

* The importance of each method was rated on a 0-20 scale, ** Number of participants who have declared had experience in that learning method.

Overall views on the training courses

Trainees agreed most strongly with the statements that "the strength of the course was to make an opportunity to meet up with peers from other districts to share experiences and also "the instructors of the courses had academic credibility". More than 78% were satisfied about the amount of time they had spent to attend in training course and more than 76% mentioned that the mix of theory and practice in the training period was acceptable and that the course dramatically has changed their thoughts. 34 percent of respondents posited the course was interesting. More than 60% of respondents were disagreed that there was too much emphasis on theory in courses and their boss did not value these courses. (Table 4)

Table 4: Health Manager Views toward the district management training fellowship courses

Statement	Attitude		
	Agree	Neutral	Disagree
	No (%)	No (%)	No (%)
Strength of this course is that it gave me the chance to meet peers from other districts	48 (80)	9 (15)	3 (5)
The course made me realize the importance of continuous learning	43 (71.6)	12 (20.0)	5 (8.4)
The teachers of the courses had academic credibility	48 (80)	12 (20.0)	
The course was interesting	45 (75.0)	13 (21.6)	2 (3.3)
The course was relevant to the work I am required to do	44 (73.3)	12 (20.0)	4 (6.7)
The course changed my way of thinking	46 (76.7)	11 (18.3)	3 (5)
The courses provided a linkage between training of individuals and institutional strengthening, so that both reinforce each other.	42 (70.0)	12 (20.0)	5 (8.3)
There should be more in-country courses of this nature	37 (61.7)	14 (23.3)	9 (15)
The course will help my career	41 (68.3)	15 (25.0)	4 (6.7)
The course was worth the time it took	47 (78.3)	9 (15)	4 (6.7)
The course changed my ways of practice things	42 (70.0)	13 (21.6)	5 (8.3)
There was an acceptable blend of theory and practice in the course	46 (76.7)	11 (18.3)	3 (5)
There was too much emphasis on theory	14 (23.3)	8 (46.7)	38 (63.3)
My boss did not value this course	14 (23.3)	9 (28.3)	37 (61.7)
The course was too demanding	37 (61.7)	13 (21.6)	10 (16.7)

Usefulness and application of the training

Based on findings, most specialized areas of knowledge meet the health managers' training needs including quality improvement, managing the district, planning and evaluation, epidemiology and advocacy and community participation. (Table 5)

Likewise, participants emphasized that managing the district, quality improvement, basic management and leadership skills, planning and evaluation, health information management and epidemiology were the most relevant courses to their career. On the other hand, accrual accounting and health economics were the least relevance factors. (Table 5)

Also, basic concepts of management and leadership, managing the district, health information management, planning and evaluation and chronic disease management were the most relevant topics for their future training. (Table 5)

Table 5: self-assessment of health manager knowledge and skills and application of the training in each of fellowships courses

Topic/Subject	Level of skills and knowledge (%)					Relevance to your work (%)			Relevance to your future training (%)	
	1	2	3	4	5	1	2	3	yes	no
Managing the District		6.9	36.2	41.4	15.5		21.4	78.6	92.5	7.5
Quality improvement	6.9	8.6	17.2	39.7	27.6	3.6	26.8	69.6	88.2	11.8
Health information management	5.3	8.8	38.6	35.1	12.3	3.6	34.5	61.8	94.0	6.0
Epidemiology	1.8	12.3	35.1	33.3	17.5	3.6	34.5	61.8	87.8	12.2
Chronic disease management	3.5	21.1	38.6	24.6	12.3	9.3	38.9	51.9	92.0	8.0
Planning and Evaluation		12.7	32.7	32.7	21.8	1.9	31.5	66.7	91.8	8.2
Research in health system	5.3	14.0	33.3	26.3	21.1	10.9	34.5	54.5	85.7	14.3
Advocacy and Community participation	1.7	15.5	36.2	25.9	20.7	5.4	37.5	57.1	88.0	12.0
Accrual accounting	27.3	32.7	16.4	14.5	9.1	25.0	44.2	30.8	63.8	36.2
Health Economics	19.6	30.4	26.8	16.1	7.1	24.5	35.8	39.6	75.0	25.0
Human Resources and Organizational creativity	5.8	28.8	25.0	25.0	15.4	15.1	32.1	52.8	82.6	17.4
Management, Leadership	1.8	25.5	29.1	29.1	14.5	5.7	26.4	67.9	95.8	4.2
Rules and ethics	10.9	27.3	23.6	23.6	14.5	11.3	34.0	54.7	89.1	10.9

- '1' – no knowledge/skills at all and '5' – comprehensive knowledge and sound practical skills.

- Relevance of the particular topic to work on a scale 1-3, where '1' –not relevant and '3' –completely relevant.

According to the results of pretest and posttest, after training, district health managers obtained the highest scores in managing the district (77 out of 100), planning and evaluation (69), chronic disease management (69), human resources and creativity (68) and epidemiology (67). Also, health information (44) and health resources management and health economics (53) gained the least score among health managers. Finally, the courses of managing the district (51%), research in health system (42%) and human resources and creativity (37%) had the most positive differences between pretest and posttest scores. (Figure 1)

Figure1: Result of the district management training fellowships' training courses pretest and post test

Discussion:

This study evaluated the district health management's fellowship training program in Tabriz based on Kirkpatrick's four-level model. This study was a self-assessment evaluation and pretests–posttest examination. The result of these analyses indicated that participants' reactions to the training program were satisfactory and training courses have had positive effect on attitude, knowledge, skills. Majority of trainees stated that they would able to apply new knowledge and skills on their job. Moreover, due to the positive impact of training program, the organization and process of district health system would be improved by trained and empowered managers.

We found that learning by practice, access to publications, workshops, and meetings and conferences were the most useful methods of learnings. In addition, learning by practice and

working with experienced persons were the most satisfactory methods of learnings. It is necessary to notice that in adult learning, learners can effectively understand teaching contents by identifying their training needs, active participation in training programs and practice what they are learning in their field [19 20]. However, some concerns should be noticed in this regard. First, due to lack of formal training in management for district health managers [11 12], the need for a formal structured management training in health setting is essential [21]. Second, it also should be noted that the methods of developing management-related competencies in real setting may be vary giving the management levels and different sectors [22-25]. Third, improving the effectiveness of the training program in management and monitoring of the specific system is most useful way to provide education services continuously for health managers.

Also, based on the results, health managers' satisfaction through online training was low. Beanland et al. indicated that the use of novel communication technology such as internet is an effective method for training in health system [26].However, in our study, low satisfaction of online training may be caused by infrastructure weakness in online learning and information technology in health system as well as low skills of health managers to use these technologies.

According to the findings, meeting peers from other districts in order to share experiences and also academic credibility of instructors were the most important features of district management training fellowships. Although, many management training program are mandatory and they are required by provincial and national authorities in most developing countries [19], but making contents and structure of training program more attractive and useful is an effective strategy to encourage attendance and increase the quality of such programs. For instance, De Brouwere et al. found that the supervision, team working and problem-solving model are the key elements of succeeded training courses [27]. Likewise, Marquez et al. revealed that problem solving training

methods can increase the skils and abilities of managers and also produce new generation of managers for organizations [28]. However, it must be notified that the policy and practice of governments and donor organizations affect the effectiveness of management capabilities [14].

Additionally, based on the study finding, regarding the managers' little knowledge of most of courses, the result of study indicated that after training program, participants were more skillful in quality improvement, managing the district and planning and evaluation. In this regard, Muchekeza et al. recognized that lack of management ability of district health executives in Midlands province, Zimbabwe [4], and weakness in leadership and priority setting in Uganda were the most perceived shortfalls among district health managers [29]. Also, leadership and governance [29 30], monitoring and evaluation, human resource management, strategic planning and general health services management [4], budgeting and finance [7 30], information management and procurement and supply [7 29] and community participation [30] were the most required training topics in different settings.

The result of our study pointed out that district health manager reached the highest score in posttest of courses of managing the district, planning and evaluation, chronic disease management, human resources and creativity and epidemiology. Moreover, health information and health resources management and health economics needed more training courses using different teaching methods. We found that the syllabus and teaching methods in this training program had the high and positive effects on improving district health managers' knowledge of managing the district, research in health system and human resources and creativity. In this regard, Pal et al. showed the most essential management training for Madhya Pradesh health managers as: district health planning, financial management, technical and administrative issues [31]. Another study has been done by Conn et al. demonstrated team planning and coordination and

resource management were the improvable aspects due to the strengthening the health management programs [14]. While, Diaz-Monsalve found that the continuity of health managers training and continuous management support were two critical factors in success and effectiveness of education [32].

Conclusion:

Tabriz health management fellowship training program was developed based on district health managers' educational need assessment in north-west of Iran, and conducted for training district health managers and it was supported by the Ministry of Health, Treatment and Medical education as well as health deputy of Tabriz University of Medical Sciences. The result of this study showed acceptable rate of trainees' satisfaction about the courses, different teaching methods and improvement in their knowledge about health system management competencies. We found that the training contents were applicable, useful and relevant to real work settings. Last but not least, conducting simultaneous and continuous supervision and support are the most beneficial strategy to improve the effectiveness of any training course.

Ethics approval and consent to participate

The Tabriz University of Medical Sciences Research & Ethics Committee (number: TBZMED.REC.1394.714) approved the design and procedure of this study. In addition, to conduct this study, all participants provided their written, signed informed consent before enrolling in the study and filling up the questionnaire. Also participants who were not interested in participation or who did not continue the research process were excluded from the study.

Consent for publication

Not applicable

Availability of data and material

The datasets supporting the conclusions of this article are included within the article.

Competing interests

The authors declare that they have no competing interests

Funding

This study was supported by the School of Management and Medical Informatics of Tabriz University of Medical Sciences, Tabriz Health Services Management Research Centre and Health Deputy of Tabriz University of Medical Sciences.

Authors' contributions

KG carried out proposal drafting, developed the study design, participated in data collection, performed the analyses and drafted the manuscript, JT carried out proposal drafting, participated in data collection and drafted the manuscript. MF participated in study design and coordination, and helped to draft the manuscript, SI participated in data collection, performed the analyses and drafted the manuscript, AG and HJ developed the study design, provided coordination and helped draft the manuscript. All authors read and approved the final manuscript.

Acknowledgment:

We are deeply grateful of the contribution of Eastern Azerbaijan province health center employees and district health managers on data collection. This study was extracted from PhD dissertation which was approved by the School of Management and Medical Informatics, Tabriz University of Medical Sciences.

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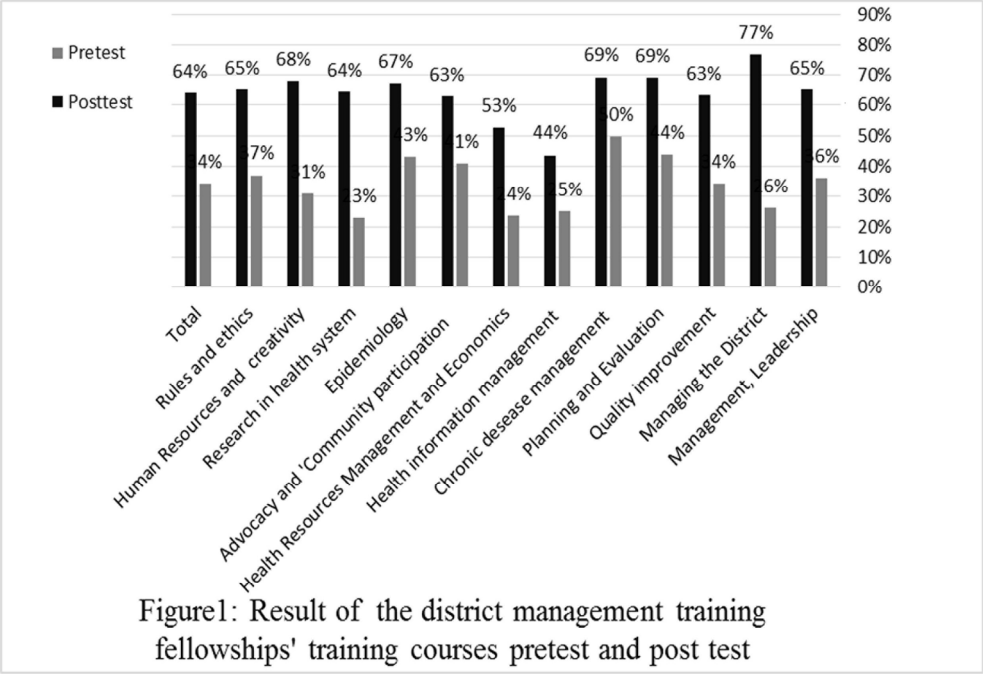

Figure1: Result of the district management training fellowships' training courses pretest and post test

Figure1: Result of the district management training fellowships' training courses pretest and post test

213x148mm (300 x 300 DPI)

GREET 2015 checklist* based upon the TIDieR guidance

BRIEF NAME	page
1. INTERVENTION: Provide a brief description of the educational intervention for all groups involved [e.g. control and comparator(s)].	4
WHY - this educational process	
2. THEORY: Describe the educational theory (ies), concept or approach used in the intervention.	5-6
3. LEARNING OBJECTIVES: Describe the learning objectives for all groups involved in the educational intervention.	7
4. EBP CONTENT: List the foundation steps of EBP (ask, acquire, appraise, apply, assess) included in the educational intervention.	7-8
WHAT	
5. MATERIALS: Describe the specific educational materials used in the educational intervention. Include materials provided to the learners and those used in the training of educational intervention providers.	6-8
6. EDUCATIONAL STRATEGIES: Describe the teaching / learning strategies (e.g. tutorials, lectures, online modules) used in the educational intervention.	6-7
7. INCENTIVES: Describe any incentives or reimbursements provided to the learners.	6
WHO PROVIDED	
8. INSTRUCTORS: For each instructor(s) involved in the educational intervention describe their professional discipline, teaching experience / expertise. Include any specific training related to the educational intervention provided for the instructor(s).	7
HOW	
9. DELIVERY: Describe the modes of delivery (e.g. face-to-face, internet or independent study package) of the educational intervention. Include whether the intervention was provided individually or in a group and the ratio of learners to instructors.	6-7
WHERE	
10. ENVIRONMENT: Describe the relevant physical learning spaces (e.g. conference, university lecture theatre, hospital ward, community) where the teaching / learning occurred.	7
WHEN and HOW MUCH	
11. SCHEDULE: Describe the scheduling of the educational intervention including the number of sessions, their frequency, timing and duration.	6-7
12. Describe the amount of time learners spent in face to face contact with instructors and any designated time spent in self-directed learning activities.	6-7
PLANNED CHANGES	
13. Did the educational intervention require specific adaptation for the learners? If yes, please describe the adaptations made for the learner(s) or group(s).	6
UNPLANNED CHANGES	
14. Was the educational intervention modified **during** the course of the study? If yes, describe the changes (what, why, when, and how).	7
HOW WELL	
15. ATTENDANCE: Describe the learner attendance, including how this was assessed and by whom. Describe any strategies that were used to facilitate attendance.	8-9
16. Describe any processes used to determine whether the materials (item 5) and the educational strategies (item 6) used in the educational intervention were delivered as originally planned.	10-11
17. Describe the extent to which the number of sessions, their frequency, timing and duration for the educational intervention was delivered as scheduled (item 11).	10-13

BMJ Open

Evaluation of district health management fellowship training program: A case study in Iran

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2017-020603.R1
Article Type:	Research
Date Submitted by the Author:	09-Jan-2018
Complete List of Authors:	gholipour, kamal; Tabriz University of Medical Sciences, Iranian Center of Excellence in Health Management; Tabriz University of Medical Sciences, Tabriz Health Services Management Research Center Tabrizi, Jafar-Sadegh; Tabriz University of Medical Sciences, Department of Health Services Management, School of Management and Medical Informatics; Tabriz University of Medical Sciences, Tabriz Health Services Management Research Center farahbakhsh, mostafa; Tabriz University of Medical Sciences, Research center of Psychiatry and Behavioural Sciences Iezadi, Shabnam; Tabriz University of Medical Sciences, Social Determinants of Health Research Center; Tabriz University of Medical Sciences, Student Research Committee Ghiasi, Akbar; The University of Alabama at Birmingham, Department of Health Services Administration, School of Health Professions Jahanbin , Hasan; Tabriz University of Medical Sciences, East Azerbaijan Provincial Health Centre
Primary Subject Heading:	Health services research
Secondary Subject Heading:	Medical education and training, Health policy
Keywords:	district health system, district health manager, management training, training program evaluation, Iran

Title page:

Evaluation of district health management fellowship training program: A case study in Iran

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Key works: district health system, district health manager, management training, training program evaluation, Iran

Word count: 3190

Evaluation of district health management fellowship training program: A case study in Iran

Abstract:

Objective: To evaluate district health management fellowship training program in north-west of Iran.

Data sources/study setting: The program was introduced to build the managerial capacity of district health managers in Iran. 89 heads of units in the province's health center, district health managers and health deputy of district health center in North-West provinces of Iran had registered to district health management fellowship training program in Tabriz in 2015-2016.

Study design: This was an educational evaluation study to evaluate training courses to measure participants' reactions and learning and to a lesser extent, application of training to their job and organizational impact.

Data collection/extraction methods: Valid and reliable questionnaires were used to assess learning techniques, views toward the fellowship and self-assessment of health managers' knowledge and skills. Also, the pretest and posttest examinations in each course were conducted and a portfolio was provided for trainees to complete in their work settings.

Principal findings: About 63% of the participants were medical doctor and 42.3% of them had over 20 years of experience. Learning by practice (scored 18.37 out of 20) and access to publications (17.27) were the most useful methods to training health planning and management from the participants' perspective. Moreover, meeting peers from other districts and academic credibility of teachers were the most important features of current program. Based on managers' self-assessment, they were most skillful in quality improvement, managing, and planning and evaluation of the district. The result of posttest analysis on data collected from district health managers showed the highest scores in managing the district (77 out of 100) and planning and evaluation (69) courses.

Conclusion: The result of this study indicated that training courses, method and improvement in managers' knowledge about health system and skills necessary to manage their organization were acceptable.

Article summary:

*Strengths **and** limitations of this study:*

- Use of short term and more subjective measures, pre-test and post-test rather than real impact of the program.
- High rate of managerial turnover makes it impossible to follow up the impact of program
- We do not analyse the role of other factors and confounders
- The developed program was used as a applicable package for training district health managers by ministry of health across country.
- Training contents were considered as applicable, useful and relevant to real work settings

Introduction:

Health system is the arrangement with organizational structure, physical resources, and different staff to improve health status of specific population. In last decades, strengthening the health system and its infrastructure has become as one of the priorities in progressive health systems especially in developing countries [1].

Strengthening of leadership and management in health system is one of the most challenging issues to be measured and there is few empirical examinations of its impact on service delivery

and health outcomes [2 3]. In addition, existing literature in developing countries indicates shortfalls in managerial capabilities and training programs. For example, Muchekeza et al conducted a study in Zimbabwe and they concluded that almost half of the district health managers do not list the tasks of district health executives and some of them had insufficient managerial skills and training programs [4]. Also, financing, health policy, and health management were perceived as the most essential needs of management trainings in Kenya, Nigeria and Senegal [5]. Bonenberger et al. demonstrated that data management, attending workshops, travelling, financial management, training of staff and drug and supply management were the highest time consuming tasks of district health managers in Ghana [6]. Furthermore, Asante et al. recognized that lack of skills in financing and human resource management among provincial health departments in the Solomon Islands were the highest concern while management support systems were not able to support managers [7].

Filerman indicated that the core competencies of health management were human resources management, general management skills and skills of top management [8]. Team based job training is an effective strategy to improve the effectiveness of management training programs [8]. The interventions designed to strengthen leadership and management must emphasize on changes in health and service delivery outcomes. However, due to complications in invastigatinge the relationship between managers' empowerment program with health provision and health status, many researchers have concentrated on managers' knowledge and skills [3 9]. According to De Brouwere's and Van Balen H's study, after implementing 12-week training course in Zaire, most of trainees applied the learned skills and knowledge. Also, team-based district health management, using of update and participatory approaches in training program could be contributed to the success of training course[10].

In Iran, the district health managers of direct rural health facilities, district hospitals, health centers, and health posts. Each of these facilities involve in providing particular cares. District hospitals deliver inpatient and outpatient services. Health centers concentrate on ambulatory and preventive services. Health posts are supposed to be the first line of exposure for patients and they are providing a large range of preventive and primary services. Also, department of provincial health center directs district health centers. Like many developing countries, general physicians are appointed as health managers of districts and sub-districts centers without any formal or in-work training [11 12].

The focus of new proposed reform in the health system that is supported by the World Bank is on market mechanisms, effectiveness and efficiency [13]. Because of the managers capabilities and their influences especially in first-line, management is one of the key determinants of health system effectiveness [8]. For instance, Conn et al. found that strengthening health management program in Gambia led to some improvements in district-level health services especially in team planning and coordination, and management of the available but limited resources [14]. Besides, Pfeffermann determined strengthening health management programs as most cost- effective interventions [15].

This study aimed to evaluate district health management fellowship training program using Kirkpatrick's four levels model (Reaction, Learning, Application and Impact) [16], in north west of Iran. The program was designed to build the managerial capacity in Iranian district health managers.

Materials and Methods:

Design and setting

This study was an evaluation of training programs based on Kirkpatrick's framework to measure participants' reactions, learning, and to the less extent, application of training in their career based on perception of respondents to apply the lessons and organizational impact. It was conducted between June 2015 and February 2016 in Tabriz.

Participants and the training program

Following the educational needs assessment proposed by the Ministry of Health, Treatment and Medical Education, a training program was developed and introduced for district health system managers in order to improve managers' skills and knowledge about health system management in National Public Health Management Centre (NPMC) of Tabriz University of Medical Sciences [17]. As a result, 89 health managers registered for this training program. Two cohorts of 89 health officials (44 and 45 participants in each cohort) were selected by Ministry of Health, Treatment and Medical Education to participate in the courses (Table 1). Our target population was all heads of provincial health centers, district health managers, and health deputy of district health center in north-west provinces of Iran.

Table 1: Training Courses of District Management Training Fellowships

Educational Courses	Summary of Content	Location*	Date (duration)
Management, Leadership	Basic Concepts of management, Leadership and supervision, Change management, Team management Conflict management, Basic Skills in Communication, Staff motivation	NPMC Tabriz, Iran	June 2015 (2 days)
Managing the District	Introduction to health and health system, PHC approach in the organization and management of health services, District health systems, Disaster preparedness, Development plans	NPMC Tabriz, Iran	June 2015 (2 days)
Quality Improvement	Quality Management in Health Systems, Quality improvement approaches, Quality improvement methods, Focus PDCA, Clinical audit, Process mapping	MUMS, Maraghe, Iran	August 2015 (3 days)
Planning and Evaluation	Situation analysis of district health, Strategic planning, Operational planning, Evaluation Methods and accreditation, Priority setting, Project planning methods	AUMS, Ardabil, Iran	September 2015 (3 days)

Health information Management	Health management information systems, Health indicators, Health data analysis	ZUMS, Zanjan, Iran	October 2015 (2 days)
Health Resources Management and Economics	Accrual accounting, Financial control, Payment mechanisms, Health economy, Management of Physical Infrastructure, Health insurance, Cost Calculation and Budgeting	NPMC Tabriz, Iran	November 2015 (3 days)
Community participation	Health need assessment in district, Health education techniques, Community Participation methods, Multisectoral Collaboration and advocacy, Social marketing, Techniques and methods for public participation	NPMC Tabriz, Iran	November 2015 (2 days)
Epidemiology	Introduction to Epidemiology, Epidemiological assessment of health Situation in a district,	NPMC Tabriz, Iran	December 2015 (2 days)
Research in health system	Quantitative and Qualitative research in health system, Data management, Data analysis	NPMC Tabriz, Iran	January 2016 (3 days)
Human Resources and Organizational creativity	Human resources management, Employee training and empowering, Effective communication, Time management, Creativity and Innovation	NPMC Tabriz, Iran	February 2016 (1 day)
Rules and ethics	Management ethics, Legal issues in Management, External inspection and accounting	NPMC Tabriz, Iran	February 2016 (1 day)

*National Public Health Management Centre (NPMC), Maraghe University of Medical Sciences (MUMS), Ardabil University of Medical Sciences (AUMS), Zanjan University of Medical Sciences (ZUMS)

Data collection and instrument

A valid and reliable questionnaire was used to collect data from participants. We used the questionnaire was designed in University of Leeds and previously were adapted and tested by NPMC staff and was used as an applicable tools to elucidate management training courses in NPMC[18]. The questionnaire contains four sections: 1) questions about demographic characteristics of respondents, 2) previous training experiences, the importance of current training program and satisfaction from different learning methods in health planning and management among district heath managers, 3) health managers' perceptions about usefulness and applicability of training programs 4) self-assessment of health managers' knowledge, skills and relevance to their job description and future training topics. Totally, 72 of the 89 training participants (response rate= 81%) filled up and gave back the questionnaire in (Table 2).

The satisfaction about different learning methods was rated based on four-point Likert scale (very high, high, moderate, low) and the experiences of different learning methods were dichotomous variable. Also, the importance of each method was rated on a 0-20 scale. These questionnaires were presented to participants at the beginning of first course of training program.

Regarding to assessment of the usefulness and perception of respondents to apply the lessons of training presented materials, respondents were asked to indicate their agreement from 15 statements (Due to negative meaning of some items, sometimes very high had negative effect on score) on a five-point Likert scale. Finally, the results were presented on a three-point scale as: agree, neutral and disagree.

Self-assessment of health managers ' knowledge and skills was rated on a four-point scale, and relevance of courses to their work and future trainings were rated on a three-point scale and dichotomous yes or no, respectively.

Furthermore, the pretest and posttest examinations in each course were conducted to evaluate the usefulness of courses in terms of contents. Pretests were performed at the beginning of each course. Simultaneously the posttest relate to previous course was performed. At the beginning of each course, course directors develop an exam sheet based on contents. Also, to avoid misunderstanding only matching, restricted response and multiple choice questions were prepared. Also, a portfolio which was based on fellowship content provided to trainees to complete in their work settings.

Ethical Considerations:

The Tabriz University of Medical Sciences Research & Ethics Committee approved the design and procedure of this study. In addition, to conduct this study, all participants provided their written, signed informed consent before enrolling in the study and filling up the questionnaire.

Lastly, participants who were not interested in contribution or who did not continue the research process were excluded from the study.

Questionnaire Analysis:

Descriptive statistics (Mean, Standard Deviation (SD) and frequencies (%)) were used to point out the basic properties of variables for quantitative and categorical variables. Also, correcting pretest and posttest examinations conducted based on standard scoring and the normalized as zero to 100. For statistical relationship analysis the SPSS-17 statistical package (SPSS, Chicago, IL) was used.

Result:

According to findings, 84.7 percent of participants were male, 61.5% of participants were between 40 to 50 years old, 41.7% of them were district health manager and 27.8% heads of units in provincial health centers. About 63.9 percent of the participants were medical doctor. Only 5.6% of participants worked 5 years or less in their current position and 36.1% of them had more than 20 -years work experience. (Table 2)

Table 2: demographics of participants in rating educational assessment

Variable	NO	%
Sex		
Male	61	84.7
Female	11	15.3
Age		
< 40	17	25
40 - 50	43	61.5
> 50	9	13.5
Education		
BSc	14	19.4
MSc	8	11.1
MD	46	63.9
PhD	4	5.6
Job Position		
Head of Unit	20	27.8
Head of District Health deputy	22	30.5

District health manager	30	41.7
Years in Current Job		
< 5	4	5.6
5 - 10	6	8.3
10 – 15	12	16.7
15 - 20	24	33.3
> 20	26	36.1

Learning for health planning and management

Respondents were asked to choose points out of range between 0- 20 points about 13 learning methods, assigning higher points to the more important methods. In this regard, learning by practice (scored 18.37 out of 20), access to publications (17.27), and workshops, meetings and conferences (14.99) were chosen as the three most important methods. (Table 3)

Also, trainees indicated that learning by practice (81.9%), working with experienced persons (73.6%), discussion with colleagues during workshops (72.2%), and meetings and conferences (70.8%) were the post experienced learning methods among health managers. (Table 3)

In satisfaction level, respondents determined learning by practice, working with experienced persons, discussion with colleagues, working with colleagues who shared training and workshops, meetings and conferences as the highest influential factors. Also, On-line learning and Practice or being involved in research reported as most unsatisfactory methods to training planning and management. (Table 3)

Table 3: Experiences and Importance of and satisfaction with learning techniques about health planning and management among district heath managers

Learning method	Importance of learning techniques*	Having experience in learning methods**	Satisfaction with learning techniques No (%)			
	Mean (SD)	No (%)	Very High	High	Moderate	Low
Learning by practice	18.37 (2.1)	59 (81.9)	29 (41.4)	33 (47.1)	8 (11.4)	

Working with experienced persons	13.12 (4.9)	53 (73.6)	26 (37.7)	37 (53.6)	5 (7.2)	1 (1.4)
Access to publications	17.27 (2.7)	49 (68.1)	8 (12.5)	33 (51.6)	20 (31.3)	3 (4.7)
Practice or being involved in research	14.75 (3.7)	33 (45.8)	7 (12.5)	18 (32.1)	26 (46.4)	5 (8.9)
On-line learning	13.07 (4.6)	28 (38.9)	5 (9.4)	17 (32.1)	23 (43.4)	8 (15.1)
Study tours	15.53 (3.4)	19 (26.4)	9 (22.0)	12 (29.3)	8 (19.5)	12 (29.3)
Formal certified training	12.90 (5.3)	47 (65.3)	9 (15.0)	29 (48.3)	16 (26.7)	6 (10.0)
Attending in workshops, meetings & conferences	14.99 (3.9)	51 (70.8)	16 (24.2)	32 (48.5)	17 (25.8)	1 (1.5)
Working with colleagues who shared training	10.72 (5.5)	46 (63.9)	17 (27.4)	34 (54.8)	9 (14.5)	2 (3.2)
Discussions with colleagues	12.72 (4.8)	52 (72.2)	19 (27.9)	35 (51.5)	13 (19.1)	1 (1.5)
Networks	12.68 (6.1)	39 (54.2)	8 (13.5)	23 (39.0)	23 (39.0)	5 (8.5)
Twinning of organizations	12.78 (4.7)	35 (48.6)	8 (13.8)	20 (34.5)	23 (39.7)	7 (12.1)

* The importance of each method was rated on a 0-20 scale, ** Number of participants who have declared had experience in that learning method.

Overall views on the training courses

Trainees agreed most strongly with the statements that "the strength of the course was to make an opportunity to meet up with peers from other districts to share experiences and also "the instructors of the courses had academic credibility". More than 78% were satisfied about the amount of time they had spent to attend in training course and more than 76% mentioned that the mix of theory and practice in the training period was acceptable and that the course dramatically has changed their thoughts. 34 percent of respondents posited the course was interesting. More than 60% of respondents were disagreed that there was too much emphasis on theory in courses and their boss did not value these courses. (Table 4)

Table 4: Health Manager Views toward the district management training fellowship courses

Statement	**Attitude**		
	Agree	**Neutral**	**Disagree**
	No (%)	**No (%)**	**No (%)**
Strength of this course is that it gave me the chance to meet peers from other districts	48 (80)	9 (15)	3 (5)
The course made me realize the importance of continuous learning	43 (71.6)	12 (20.0)	5 (8.4)
The teachers of the courses had academic credibility	48 (80)	12 (20.0)	
The course was interesting	45 (75.0)	13 (21.6)	2 (3.3)
The course was relevant to the work I am required to do	44 (73.3)	12 (20.0)	4 (6.7)

The course changed my way of thinking	46 (76.7)	11 (18.3)	3 (5)
The courses provided a linkage between training of individuals and institutional strengthening, so that both reinforce each other.	42 (70.0)	12 (20.0)	5 (8.3)
There should be more in-country courses of this nature	37 (61.7)	14 (23.3)	9 (15)
The course will help my career	41 (68.3)	15 (25.0)	4 (6.7)
The course was worth the time it took	47 (78.3)	9 (15)	4 (6.7)
The course changed my ways of practice things	42 (70.0)	13 (21.6)	5 (8.3)
There was an acceptable blend of theory and practice in the course	46 (76.7)	11 (18.3)	3 (5)
There was too much emphasis on theory	14 (23.3)	8 (46.7)	38 (63.3)
My boss did not value this course	14 (23.3)	9 (28.3)	37 (61.7)
The course was too demanding	37 (61.7)	13 (21.6)	10 (16.7)

Usefulness and perception of respondents to apply the lessons of the training

Based on findings, most specialized areas of knowledge meet the health managers' training needs including quality improvement, managing the district, planning and evaluation, epidemiology and advocacy and community participation. (Table 5)

Likewise, participants emphasized that managing the district, quality improvement, basic management and leadership skills, planning and evaluation, health information management and epidemiology were the most relevant courses to their career. On the other hand, accrual accounting and health economics were the least relevance factors. (Table 5)

Also, basic concepts of management and leadership, managing the district, health information management, planning and evaluation and chronic disease management were the most relevant topics for their future training. (Table 5)

Table 5: self-assessment of health manager knowledge and skills and perception of respondents to apply the lessons of the training in each of fellowships courses

Topic/Subject	Level of skills and knowledge (%)					Relevance to your work (%)			Relevance to your future training (%)	
	1	2	3	4	5	1	2	3	yes	no
Managing the District		6.9	36.2	41.4	15.5		21.4	78.6	92.5	7.5
Quality improvement	6.9	8.6	17.2	39.7	27.6	3.6	26.8	69.6	88.2	11.8
Health information management	5.3	8.8	38.6	35.1	12.3	3.6	34.5	61.8	94.0	6.0
Epidemiology	1.8	12.3	35.1	33.3	17.5	3.6	34.5	61.8	87.8	12.2

Chronic disease management	3.5	21.1	38.6	24.6	12.3	9.3	38.9	51.9	92.0	8.0
Planning and Evaluation		12.7	32.7	32.7	21.8	1.9	31.5	66.7	91.8	8.2
Research in health system	5.3	14.0	33.3	26.3	21.1	10.9	34.5	54.5	85.7	14.3
Advocacy and Community participation	1.7	15.5	36.2	25.9	20.7	5.4	37.5	57.1	88.0	12.0
Accrual accounting	27.3	32.7	16.4	14.5	9.1	25.0	44.2	30.8	63.8	36.2
Health Economics	19.6	30.4	26.8	16.1	7.1	24.5	35.8	39.6	75.0	25.0
Human Resources and Organizational creativity	5.8	28.8	25.0	25.0	15.4	15.1	32.1	52.8	82.6	17.4
Management, Leadership	1.8	25.5	29.1	29.1	14.5	5.7	26.4	67.9	95.8	4.2
Rules and ethics	10.9	27.3	23.6	23.6	14.5	11.3	34.0	54.7	89.1	10.9

- '1' – no knowledge/skills at all and '5' – comprehensive knowledge and sound practical skills.
- Relevance of the particular topic to work on a scale 1-3, where '1' –not relevant and '3' –completely relevant.

According to the results of pretest and posttest, after training, district health managers obtained the highest scores in managing the district (77 out of 100), planning and evaluation (69), chronic disease management (69), human resources and creativity (68) and epidemiology (67). Also, health information (44) and health resources management and health economics (53) gained the least score among health managers. Finally, the courses of managing the district (51%), research in health system (42%) and human resources and creativity (37%) had the most positive differences between pretest and posttest scores. (Figure 1)

Figure1: Result of the district management training fellowships' training courses pretest and post test

Discussion:

This study evaluated the district health management's fellowship training program in Tabriz based on Kirkpatrick's four-level model. This study was a self-assessment evaluation and pretests–posttest examination. The result of these analyses indicated that participants' reactions

to the training program were satisfactory and training courses have had positive effect on attitude, knowledge and skills. Based respondentsperception majority of trainees stated that they would able to apply new knowledge and skills on their job. Moreover, due to the positive impact of training program, the organization and process of district health system would be improved by trained and empowered managers.

We found that learning by practice, access to publications, workshops, and meetings and conferences were the most useful methods of learning. In addition, learning by practice and working with experienced were the most satisfactory methods of learning. It is necessary to notice that in adult learning, learners can effectively understand teaching contents by identifying their training needs, active participation in training programs and practice what they are learning in their field [19 20]. However, some concerns should be noticed in this regard. First, due to lack of formal training in management for district health managers [11 12], the need for a formal structured management training in health setting is essential [21]. Second, it also should be noted that the methods of developing management-related competencies in real setting may be vary giving the management levels and different sectors [22-25]. Third, improving the effectiveness of the training program in management and monitoring of the specific system is most useful way to provide education services continuously for health managers.

Also, based on the results, health managers' satisfaction through online training was low. Beanland et al. indicated that the use of novel communication technology such as internet is an effective method for training in health system [26].However, in our study, low satisfaction of online training may be caused by infrastructure weakness in online learning and information technology in health system as well as low skills of health managers to use these technologies.

According to the findings, meeting peers from other districts in order to share experiences and also academic credibility of instructors were the most important features of district management training fellowships. Although, many management training program are mandatory and they are required by provincial and national authorities in most developing countries [19], but making contents and structure of training program more attractive and useful is an effective strategy to encourage attendance and increase the quality of such programs. For instance, De Brouwere et al. found that the supervision, team working and problem-solving model are the key elements of succeeded training courses [27]. Likewise, Marquez et al. revealed that problem solving training methods can increase the skils and abilities of managers and also produce new generation of managers for organizations [28]. However, it must be notified that the policy and practice of governments and donor organizations affect the effectiveness of management capabilities [14].

Additionally, based on the study finding, regarding the managers' little knowledge of most of courses, the result of study indicated that after training program, participants were more skillful in quality improvement, managing the district and planning and evaluation. In this regard, Muchekeza et al. recognized that lack of management ability of district health executives in Midlands province, Zimbabwe [4], and weakness in leadership and priority setting in Uganda were the most perceived shortfalls among district health managers [29]. Also, leadership and governance [29 30], monitoring and evaluation, human resource management, strategic planning and general health services management [4], budgeting and finance [7 30], information management and procurement and supply [7 29] and community participation [30] were the most required training topics in different settings.

The result of our study pointed out that district health manager reached the highest score in posttest of courses of managing the district, planning and evaluation, chronic disease

management, human resources and creativity and epidemiology. Moreover, health information and health resources management and health economics needed more training courses using different teaching methods. We found that the syllabus and teaching methods in this training program had the high and positive effects on improving district health managers' knowledge of managing the district, research in health system and human resources and creativity based on participants self-assessment. Whereas these findings emerged based on participants self-assessment and do not be tested in real setting and in the implementation phase and so it's not possible to conclude definitively and practically, however, it can be used as an initial indicator of the effect of educational program in the real setting. In this regard, Pal et al. showed the most essential management training for Madhya Pradesh health managers as: district health planning, financial management, technical and administrative issues [31]. Another study has been done by Conn et al. demonstrated team planning and coordination and resource management were the improvable aspects due to the strengthening the health management programs [14]. While, Diaz-Monsalve found that the continuity of health managers training and continuous management support were two critical factors in success and effectiveness of education [32].

Conclusion:

Tabriz health management fellowship training program was developed based on district health managers' educational need assessment in north-west of Iran, and conducted for training district health managers and it was supported by the Ministry of Health, Treatment and Medical education as well as health deputy of Tabriz University of Medical Sciences. The result of this study showed acceptable rate of trainees' satisfaction about the courses, different teaching methods and improvement in their knowledge about health system management competencies. We found that the training contents were applicable, useful and relevant to real work settings.

Last but not least, conducting simultaneous and continuous supervision and support are the most beneficial strategy to improve the effectiveness of any training course.

Ethics approval and consent to participate

The Tabriz University of Medical Sciences Research & Ethics Committee (number: TBZMED.REC.1394.714) approved the design and procedure of this study. In addition, to conduct this study, all participants provided their written, signed informed consent before enrolling in the study and filling up the questionnaire. Also participants who were not interested in participation or who did not continue the research process were excluded from the study.

Consent for publication

Not applicable

Availability of data and material

The datasets supporting the conclusions of this article are included within the article.

Competing interests

The authors declare that they have no competing interests

Funding

This study was supported by the School of Management and Medical Informatics of Tabriz University of Medical Sciences, Tabriz Health Services Management Research Centre and Health Deputy of Tabriz University of Medical Sciences.

Authors' contributions

KG carried out proposal drafting, developed the study design, participated in data collection, performed the analyses and drafted the manuscript, JT carried out proposal drafting, participated in data collection and drafted the manuscript. MF participated in study design and coordination,

and helped to draft the manuscript, SI participated in data collection, performed the analyses and drafted the manuscript, AG and HJ developed the study design, provided coordination and helped draft the manuscript. All authors read and approved the final manuscript.

Acknowledgment:

We are deeply grateful of the contribution of Eastern Azerbaijan province health center employees and district health managers on data collection. This study was extracted from PhD dissertation which was approved by the School of Management and Medical Informatics, Tabriz University of Medical Sciences.

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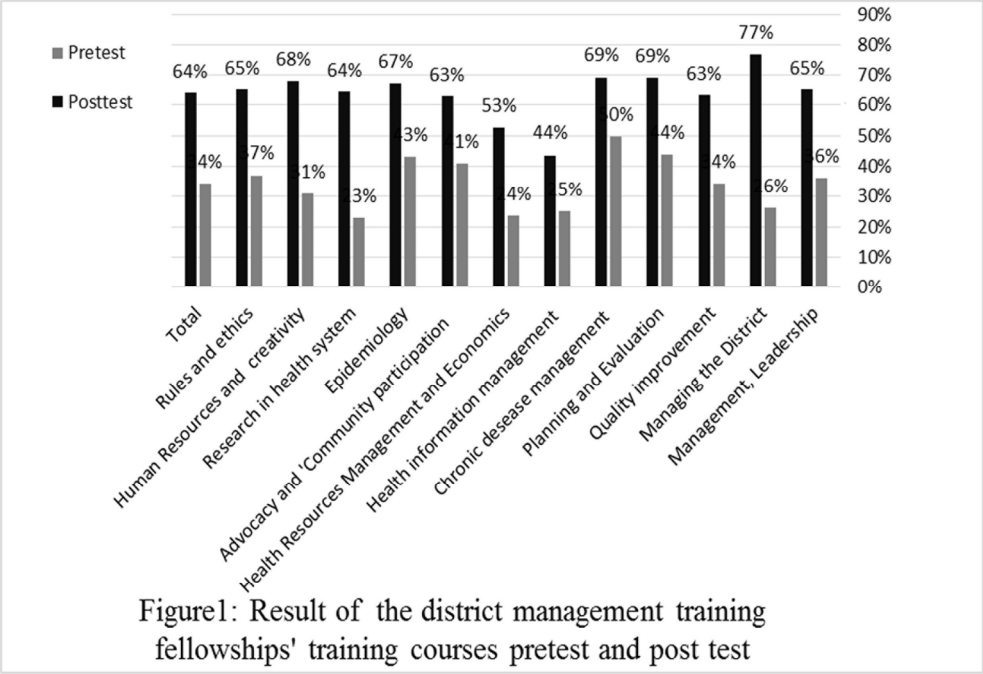

Figure1: Result of the district management training fellowships' training courses pretest and post test

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213x148mm (300 x 300 DPI)

GREET 2015 checklist* based upon the TIDieR guidance

BRIEF NAME	page
1. INTERVENTION: Provide a brief description of the educational intervention for all groups involved [e.g. control and comparator(s)].	4
WHY - this educational process	
2. THEORY: Describe the educational theory (ies), concept or approach used in the intervention.	5-6
3. LEARNING OBJECTIVES: Describe the learning objectives for all groups involved in the educational intervention.	7
4. EBP CONTENT: List the foundation steps of EBP (ask, acquire, appraise, apply, assess) included in the educational intervention.	7-8
WHAT	
5. MATERIALS: Describe the specific educational materials used in the educational intervention. Include materials provided to the learners and those used in the training of educational intervention providers.	6-8
6. EDUCATIONAL STRATEGIES: Describe the teaching / learning strategies (e.g. tutorials, lectures, online modules) used in the educational intervention.	6-7
7. INCENTIVES: Describe any incentives or reimbursements provided to the learners.	6
WHO PROVIDED	
8. INSTRUCTORS: For each instructor(s) involved in the educational intervention describe their professional discipline, teaching experience / expertise. Include any specific training related to the educational intervention provided for the instructor(s).	7
HOW	
9. DELIVERY: Describe the modes of delivery (e.g. face-to-face, internet or independent study package) of the educational intervention. Include whether the intervention was provided individually or in a group and the ratio of learners to instructors.	6-7
WHERE	
10. ENVIRONMENT: Describe the relevant physical learning spaces (e.g. conference, university lecture theatre, hospital ward, community) where the teaching / learning occurred.	7
WHEN and HOW MUCH	
11. SCHEDULE: Describe the scheduling of the educational intervention including the number of sessions, their frequency, timing and duration.	6-7
12. Describe the amount of time learners spent in face to face contact with instructors and any designated time spent in self-directed learning activities.	6-7
PLANNED CHANGES	
13. Did the educational intervention require specific adaptation for the learners? If yes, please describe the adaptations made for the learner(s) or group(s).	6
UNPLANNED CHANGES	
14. Was the educational intervention modified **during** the course of the study? If yes, describe the changes (what, why, when, and how).	7
HOW WELL	
15. ATTENDANCE: Describe the learner attendance, including how this was assessed and by whom. Describe any strategies that were used to facilitate attendance.	8-9
16. Describe any processes used to determine whether the materials (item 5) and the educational strategies (item 6) used in the educational intervention were delivered as originally planned.	10-11
17. Describe the extent to which the number of sessions, their frequency, timing and duration for the educational intervention was delivered as scheduled (item 11).	10-13